CLAIMS:

1.   An eye-drop vaccine for therapeutic immunization of a mammal comprising an active agent selected from the group consisting of Copolymer 1, a Copolymer 1-related peptide, and a Copolymer 1-related polypeptide.

2.   An eye-drop vaccine according to claim 1 for treating neuronal degeneration caused by an injury, disease, disorder or condition in the central nervous system (CNS) or peripheral nervous system (PNS), for preventing or inhibiting neuronal secondary degeneration which may otherwise follow a primary injury in the CNS, for promoting nerve regeneration in the CNS or in the PNS after injury or disease, disorder or condition or for protecting CNS and PNS cells from glutamate toxicity.

3.   An eye-drop vaccine according to claim 2, wherein said injury is spinal cord injury, blunt trauma, penetrating trauma, brain coup or contrecoup, hemorrhagic stroke, or ischemic stroke.

4.   An eye-drop vaccine according to claim 2, wherein said disease, disorder or condition is a senile dementia including Alzheimer's disease, a Parkinsonian syndrome including Parkinson's disease, facial nerve (Bell's) palsy, Huntington's chorea, a motor neuron disease including amyotrophic lateral sclerosis, a prion disease including Creutzfeldt-Jakob disease, Alper's disease, Batten disease, Cockayne syndrome, Lewy body disease, status epilepticus, carpal tunnel syndrome, intervertebral disc herniation, vitamin deficiency such as vitamin B deficiency, seizure disorders such as epilepsy, psychotic disorders such as schizophrenia and anxiety, amnesia, hyperalgesia, oxidative stress, opiate tolerance and dependence, an autoimmune disease, a peripheral neuropathy associated with a disease such as amyloid polyneuropathy, diabetic neuropathy, uremic neuropathy, porphyric polyneuropathy, hypoglycemia, Sjogren-Larsson syndrome, acute sensory neuropathy, chronic ataxic neuropathy, biliary cirrhosis, primary amyloidosis, obstructive lung diseases, acromegaly, malabsorption syndromes,

polycythemia vera, IgA and IgG gammapathies, complications of various drugs such as nitrofurantoin, metronidazole, isoniazid and toxins such as alcohol or organophosphates, Charcot-Marie-Tooth disease, ataxia telangiectasia, Friedreich's ataxia, adrenomyeloneuropathy, giant axonal neuropathy, Refsum's disease, Fabry's disease, lipoproteinemia, non-arteritic optic neuropathy, age-related macular degeneration, a retinal disorder such as retinal degeneration, or a disease associated with abnormally elevated intraocular pressure such as glaucoma.

5.   An eye-drop vaccine according to claim 4, wherein said autoimmune disease is multiple sclerosis.

6.   An eye-drop vaccine according to claim 1, wherein said vaccine comprises the active agent without an adjuvant.

7.   An eye-drop vaccine according to claim 1, wherein said vaccine comprises the active agent with a soluble adjuvant.

8.   An eye-drop vaccine according to claim 7, wherein said soluble adjuvant is a cytokine.

9.   An eye-drop vaccine according to claim 8, wherein said cytokine is IL-2, IL-12, IFN-γ or GM-CSF.

10.   An eye-drop vaccine according to any one of claims 1 to 9, wherein said active agent is Copolymer 1.

11.   An eye-drop vaccine according to any one of claims 1 to 9, wherein said active agent is a Copolymer 1-related peptide or a Copolymer 1-related polypeptide.

12.   An eye-drop vaccine according to claim 1, for administration at a frequency of at least once every day or every alternate day to a multiple sclerosis patient.

13.   An eye-drop vaccine according to claim 1, for administration periodically at a frequency of at least once every seven days, to at least once every month to at least once every 2-3 months, to a non-multiple sclerosis patient.

14.   An eye-drop vaccine according to claim 13, for administration to a glaucoma patient.

15.   Use of an active agent selected from the group consisting of Copolymer 1, a Copolymer 1-related peptide, and a Copolymer 1-related polypeptide, for the preparation of an eye-drop vaccine for therapeutic immunization of a mammal.

16.   Use according to claim 15, wherein said eye-drop vaccine is for treating neuronal degeneration caused by an injury, disease, disorder or condition in the central nervous system (CNS) or peripheral nervous system (PNS), for preventing or inhibiting neuronal secondary degeneration which may otherwise follow a primary injury in the CNS, for promoting nerve regeneration in the CNS or in the PNS after an injury, disease, disorder or condition, or for protecting CNS and PNS cells from glutamate toxicity.

17.   Use according to claim 16, wherein said injury is spinal cord injury, blunt trauma, penetrating trauma, brain coup or contrecoup, hemorrhagic stroke, or ischemic stroke.

18.   Use according to claim 16, wherein said disease is a senile dementia including Alzheimer's disease, a Parkinsonian syndrome including Parkinson's disease, facial nerve (Bell's) palsy, Huntington's chorea, a motor neuron disease including amyotrophic lateral sclerosis, a prion disease including Creutzfeldt-Jakob disease, Alper's disease, Batten disease, Cockayne syndrome, Lewy body disease, status epilepticus, carpal tunnel syndrome, intervertebral disc herniation, vitamin deficiency such as vitamin B deficiency, epilepsy, amnesia, anxiety, hyperalgesia, psychosis, seizures, oxidative stress, opiate tolerance and dependence, an autoimmune disease, or a peripheral neuropathy associated with a disease such as

amyloid polyneuropathy, diabetic neuropathy, uremic neuropathy, porphyric polyneuropathy, hypoglycemia, Sjogren-Larsson syndrome, acute sensory neuropathy, chronic ataxic neuropathy, biliary cirrhosis, primary amyloidosis, obstructive lung diseases, acromegaly, malabsorption syndromes, polycythemia vera, IgA and IgG gammapathies, complications of various drugs such as nitrofurantoin, metronidazole, isoniazid and toxins such as alcohol or organophosphates, Charcot-Marie-Tooth disease, ataxia telangiectasia, Friedreich's ataxia, adrenomyeloneuropathy, giant axonal neuropathy, Refsum's disease, Fabry's disease, lipoproteinemia, non-arteritic optic neuropathy, age-related macular degeneration, a retinal disorder such as retinal degeneration or a disease associated with abnormally elevated intraocular pressure such as glaucoma.

19. Use according to claim 18, wherein said autoimmune disease is multiple sclerosis.

20. Use according to claim 15, wherein said eye-drop vaccine comprises the active agent without an adjuvant.

21. Use according to claim 15, wherein said eye-drop vaccine comprises the active agent with a soluble adjuvant.

22. Use according to claim 21, wherein said soluble adjuvant is a cytokine.

23. Use according to claim 22, wherein said cytokine is IL-2, IL-12, IFN-γ or GM-CSF.

24. Use according to any one of claims 15 to 23, wherein said active agent is Copolymer 1.

25. Use according to any one of claims 15 to 23, wherein said active agent is a Copolymer 1-related peptide or a Copolymer 1-related polypeptide.

26.   Use according to claim 15, wherein said eye-drop vaccine is for administration at a frequency of at least once every day or every alternate day to a multiple sclerosis patient.

27.   Use according to claim 15, wherein said eye-drop vaccine is for administration periodically at a frequency of at least once every seven days, to at least once every month to at least once every 2-3 months, to a non-multiple sclerosis patient.

28.   Use according to claim 27, for administration to a glaucoma patient.

29.   Use of Copolymer 1 for the preparation of an eye-drop vaccine for treatment of glaucoma.

30.   A method of therapeutic immunization for treating neuronal degeneration caused by an injury, disease, disorder or condition in the central nervous system (CNS) or peripheral nervous system (PNS), for preventing or inhibiting neuronal secondary degeneration which may otherwise follow a primary injury in the CNS, for promoting nerve regeneration in the CNS or in the PNS after an injury, disease, disorder or condition or for protecting CNS and PNS cells from glutamate toxicity, which comprises immunizing an individual in need with an eye-drop vaccine comprising an active agent selected from the group consisting of Copolymer 1, a Copolymer 1-related peptide, and a Copolymer 1-related polypeptide, in an amount effective to treat, prevent or inhibit said neuronal degeneration caused by said injury, disease, disorder or condition in the individual.

31.   A method according to claim 30, wherein said injury is spinal cord injury, blunt trauma, penetrating trauma, brain coup or contrecoup, hemorrhagic stroke, or ischemic stroke.

32.   A method according to claim 30, wherein said disease is a senile dementia including Alzheimer's disease, a Parkinsonian syndrome including Parkinson's disease, facial nerve (Bell's) palsy, Huntington's chorea, a motor neuron disease

including amyotrophic lateral sclerosis, a prion disease including Creutzfeldt-Jakob disease, Alper's disease, Batten disease, Cockayne syndrome, Lewy body disease, status epilepticus, carpal tunnel syndrome, intervertebral disc herniation, vitamin deficiency such as vitamin B deficiency, epilepsy, amnesia, anxiety, hyperalgesia,

5   psychosis, seizures, oxidative stress, opiate tolerance and dependence, an autoimmune disease, or a peripheral neuropathy associated with a disease such as amyloid polyneuropathy, diabetic neuropathy, uremic neuropathy, porphyric polyneuropathy, hypoglycemia, Sjogren-Larsson syndrome, acute sensory neuropathy, chronic ataxic neuropathy, biliary cirrhosis, primary amyloidosis,

10   obstructive lung diseases, acromegaly, malabsorption syndromes, polycythemia vera, IgA and IgG gammapathies, complications of various drugs such as nitrofurantoin, metronidazole, isoniazid and toxins such as alcohol or organophosphates, Charcot-Marie-Tooth disease, ataxia telangiectasia, Friedreich's ataxia, adrenomyeloneuropathy, giant axonal neuropathy, Refsum's disease, Fabry's

15   disease, lipoproteinemia, non-arteritic optic neuropathy, age-related macular degeneration, a retinal disorder such as retinal degeneration, or a disease associated with abnormally elevated intraocular pressure such as glaucoma.

33.   A method according to claim 32, wherein said autoimmune disease is multiple sclerosis.

20   34.   A method according to claim 30, which comprises immunization with the active agent without an adjuvant.

35.   A method according to claim 30, which comprises immunization with the active agent with a soluble adjuvant.

36.   A method according to claim 35, wherein said soluble adjuvant is a cytokine.

25   37.   A method according to claim 36, wherein said cytokine is IL-2, IL-12, IFN-γ or GM-CSF.

38.   A method according to claim 30, wherein said active agent is Copolymer 1.

39.   A method according to claim 30, wherein said active agent is a Copolymer 1-related peptide or a Copolymer 1-related polypeptide.

40.   A method according to claim 30, wherein said vaccine is administered at a frequency of at least once every day or every alternate day to a multiple sclerosis
5   patient.

41.   A method according to claim 30, wherein said vaccine is administered periodically at a frequency of at least once every seven days, to at least once every month to at least once every 2-3 months, to a non-multiple sclerosis patient.

42.   A method of therapeutic immunization of a glaucoma patient which
10   comprises administering to the patient an eye-drop vaccine comprising Copolymwe 1 in an amount effective to treat glaucoma in said patient.

43.   A method for reducing neuronal degeneration caused by the neurodegenerative effects of a disease, or for reducing secondary neuronal degeneration that follows the primary neuronal degeneration of an injury, in the
15   central nervous system (CNS) or peripheral nervous system (PNS) of an individual in need thereof, which comprises immunizing the individual in need with an eye-drop vaccine comprising an active agent selected from the group consisting of Copolymer 1, a Copolymer 1-related peptide, and a Copolymer 1-related polypeptide, in an amount effective to reduce said neuronal degeneration caused by
20   injury or disease in said individual.

25